Appendix A
Glossary

Agglomerate	An ice cover floe formed by the freezing together of various forms of ice.
Anchor ice	Submerged ice attached or anchored to the bottom, irrespective of the nature of its formation.
Anchor ice dam	An accumulation of anchor ice that acts as a dam and raises the water level.
Beginning of breakup	Rivers: Date of definite breaking or movement of ice attributable to melting, currents, or rise of water level. Lakes: Date of visual evidence of initial deterioration along shoreline, such as the appearance of shore leads.
Beginning of freezeup	Date on which ice forms a stable winter ice cover.
Black ice	Transparent ice formed in rivers and lakes.
Border ice	Ice sheet in the form of a long border attached to the bank or shore; *shore ice*.
Brackish ice	Ice formed from brackish water.
Brash ice	Accumulations of floating ice made up of fragments not more than about 2 meters (6 feet) across; the wreckage of other forms of ice.
Breakup	Disintegration of ice cover.
Breakup date	Date on which a body of water is first observed to be entirely clear of ice and remains clear thereafter.
Breakup jam	Ice jam that occurs as a result of the accumulation of broken ice pieces.
Breakup period	Period of disintegration of an ice cover.
Candle ice	Rotten columnar-grained ice.
Channel lead	Elongated opening in the ice cover caused by a water current.
Channelization	Modification of a natural river channel; may include deepening, widening, or straightening.
Columnar ice	Ice consisting of columnar-shaped grains. The ordinary black ice is usually columnar-grained.

Concentration	The ratio (in eighths or tenths) of the water surface actually covered by ice to the total area of surface, both ice-covered and ice-free, at a specific location or over a defined area.
Conveyance	A measure of the carrying capacity of a river channel.
CRREL	U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire.
Degree-day	Also termed *freezing degree-day*, a measure of the departure of the mean daily temperature *below* a given standard, usually 0°C (32°F). For example, a day with an average temperature of –5°C (23°F) represents 9 freezing degree-days by the Fahrenheit scale (5 freezing degree-days by the Celsius scale). Accumulated freezing degree-days (AFDD) are simply the sum of any number of degree-days. For example, the AFDD of a week with mean daily temperature of –5, 0, +5, 0, –5, –10, and –5°C are 20 freezing degree-days by the Celsius scale (23, 32, 41, 32, 23, 14, and 23°F) 36 freezing degree-days by the Fahrenheit scale.
Drifting ice	Pieces of floating ice moving under the action of wind or currents.
Dry crack	Crack visible at the surface but not extending through the ice cover, and therefore dry.
Duration of ice cover	The time from freezeup to breakup of an ice cover.
Dynamic ice pressure	Pressure attributable to a moving ice cover or drifting ice. Pressure occurring at moment of first contact termed ice impact pressure.
Floating ice	Any form of ice floating in water.
Floc	A cluster of frazil particles.
Floe	See *Ice floe*.
Flooded ice	Ice that has been flooded by melt water or river water and is heavily loaded by water and wet snow.
Floodplain	Land area adjoining a water body that is not normally submerged but may be submerged during flood conditions.
Fracture	Any break or rupture formed in an ice cover or floe by deformation.
Fracture zone	An area that has a great number of fractures.
Fracturing	Deformation process where fracture occurs and the ice is permanently deformed.
Frazil	Fine spicules, plates, or discoids of ice suspended in water. In rivers and lakes it is formed in supercooled, turbulent waters.

Frazil slush	An agglomerate of loosely packed frazil that floats or accumulates under the ice cover.
Freezeup date	The date on which the water body is first observed to be completely frozen over.
Freezeup jam	Ice jam formed as frazil ice accumulates and thickens.
Freezeup period	Period of initial formation of an ice cover.
Frost smoke	Fog-like clouds caused by contact of cold air with relatively warm water that can appear over openings in the ice or leeward of the ice edge and may persist while ice is forming.
Froude number	$F_R = V\sqrt{gH}$ where V = mean velocity, g = gravitational acceleration, and H = water depth.
Frozen frazil slush	Accumulation of slush that has completely frozen.
Glare ice	Ice cover with a highly reflective surface.
Gorge	An archaic or localized term for an ice jam; see *ice gorge*.
Grounded ice	Ice that has run aground or is in contact with ground underneath it.
Hanging dam	A mass of ice composed mainly of frazil or broken ice deposited under an ice cover in a region of low flow velocity.
Hinge crack	Crack caused by significant changes in water level.
Hummock	A hillock of fractured ice that has been forced upward by pressure.
Hummocked ice	Ice piled haphazardly, one piece over another, to form an uneven surface.
Hummocking	The pressure process by which ice is forced into hummocks.
Hydraulic radius	$R = A/p$, where A = cross-sectional flow area, p = wetted perimeter.
Ice arch	Frazil or fragmented ice that has stopped moving and bridges across a river channel; also called an *ice bridge*.
Ice boom	Floating structure designed to retain ice.
Ice bridge	A continuous ice cover of limited size extending from shore to shore like a bridge.
Ice cover	A significant expanse of ice of any form on the surface of a body of water.
Ice crossing	Man-made ice bridge.

Ice floe	Free-floating piece of ice greater than about 1 meter (3 feet) in extent.
Ice foot	A narrow fringe of thickened ice attached to the shore and unmoved by changes in water level.
Ice free	No floating ice present.
Ice gorge	A local term for ice jams, used primarily on the central U.S. rivers. This term is subject to regional variations in meaning.
Ice jam	A stationary accumulation of fragmented ice or frazil, which restricts or blocks a stream channel. This term is subject to regional variations in meaning.
Ice jamming	Process of ice accumulation to form an ice jam.
Ice ledge	Narrow fringe of ice that remains along the shores of a river after breakup. Also termed *shear wall*.
Ice push	Compression of an ice cover, particularly at the front of a moving section of ice cover.
Ice run	Flow of ice in a river. An ice run may be light or heavy, and may consist of frazil, anchor, slush, or sheet ice.
Ice sheet	A smooth, continuous ice cover.
Ice shove	On-shore ice push caused by wind and currents, changes in temperature, etc.
Ice twitch	Downstream movement of a small section of an ice cover. Ice twitches occur suddenly and often appear successively.
In situ breakup	Melting in place.
Lake ice	Ice formed on a lake, regardless of observed location.
Lead	Long, narrow opening in the ice.
Manning equation	$V = 1.486\ R^{2/3}S^{1/2}/n$ in English units ($V = R^{2/3}S^{1/2}/n$ in SI units) where V = mean flow velocity, R = hydraulic radius, and S = hydraulic slope; n is a coefficient of roughness.
Mush ice	Floating accumulation of very fine ice fragments (around 0.25 centimeters [0.1 inch] in size) that is somewhat cohesive.
New ice	A general term for recently formed ice, which includes frazil ice, slush, shuga (sludge), and other types of ice.
Overbank flow	Flow that exceeds the level of a river's banks and extends into the floodplain.

Pancake ice	Circular flat pieces of ice with raised rims; the shape and rim are caused by repeated collisions.
Polynya	Any nonlinear-shaped opening enclosed by ice. Polynyas may contain brash ice or be covered with new ice.
Pressure ridge	Line or wall of broken ice forced up by pressure.
Puddle	Accumulation of melt water on ice, mainly from melting snow but in the more advanced stages also from the melting of ice. Initial stage consists of patches of melted snow.
Rafted ice	Type of deformed ice formed by one piece of ice overriding another.
Rafting	Pressure processes whereby one piece of ice overrides another. Most common in new ice.
Ridge	A line or wall of broken ice forced up by pressure. May be fresh or weathered.
Ridged ice	Ice piled haphazardly, one piece over another in the form of ridges or walls.
Riprap	Rocks strategically placed against riverbanks or beds to prevent erosion of underlying material.
Rotten ice	Ice in an advanced stage of disintegration.
Rough ice	General term for ice covers with rough surfaces.
Sea ice	Any form of ice originating from the freezing of seawater.
Shear crack	Crack formed by movement parallel to the surface of the crack.
Shear wall	Ice accumulation having a vertical wall or face and remaining along the shores of a river after an ice jam has released. The height of the vertical face provides an estimate of the thickness of the ice jam.
Shearing	Motion of an ice cover because of horizontal shear stresses.
Sheet ice	A smooth, continuous ice cover formed by in situ freezing (lake ice) or by the arrest and juxtaposition of ice floes in a single layer.
Shore depression	Depression in the ice cover along the shore often caused by a change in water level.
Shore ice	See *border ice*.
Shore lead	A water opening along the shore.
Skim ice	Initial thin layer of ice on a water surface.

Sludge	An accumulation of spongy ice lumps formed from compressed frazil, slush, snow slush, or anchor ice.
Slush ball	Result of extremely compact accretion of snow, frazil, and ice particles. This is produced by wind and wave action along the shore of lakes or in long stretches of turbulent flow in rivers.
Slush-ice run	Ice run composed mainly of slush ice.
Snow ice	Ice that forms when snow slush freezes on an ice cover. The presence of air bubbles makes it appear white.
Snow slush	Snow that is saturated with water on ice surfaces, or as a viscous mass floating in water after a heavy snowfall.
Static ice pressure	Pressure developed by a static ice cover.
Stranded ice	Ice that has been floating and has been deposited on the shore by a lowering of the water level.
Supercooled water	Water whose temperature is slightly below the freezing point (0°C or 32°F).
Surface crack	Crack visible at the surface.
Thalweg	Deepest portion of the river channel; the line of major flow.
Thaw holes	Vertical holes in ice formed when surface puddles melt through to the underlying water.
Thermal crack	Crack caused by contraction of ice caused by a change in temperature.
Through crack	Crack extending through the ice cover. Sometimes called a wet crack.
Tide crack	Crack caused by rise and fall of tides. A special kind of hinge crack.
Unconsolidated ice cover	Loose mass of floating ice.
Water slope	Change in water surface elevation per unit distance.
Water stage	The water surface elevation above the bottom of the river channel or above some arbitrary datum.
Weir	Barrier placed in a river to raise water elevation.
White ice	See *snow ice*.